UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, ILLINOIS 60604

DATE:	See Date of Section Chief Signature Below
SUBJECT:	CLEAN AIR ACT INSPECTION REPORT Waste Management – Prairie Hill Landfill, Morrison, Illinois
FROM:	Vicky Mei, Environmental Engineer AECAB (IL/IN)
THRU:	Nathan Frank, Section Chief AECAB (IL/IN)
TO:	File

BASIC INFORMATION

Facility Name: Prairie Hill Landfill

Facility Location: 18762 Lincoln Road, Morrison, Illinois 61270

Date of Inspection: June 2, 2021 and June 17, 2021

EPA Inspector(s):
1. Vicky Mei, Environmental Engineer
2. Daniel Heins, Environmental Scientist

Other Attendees on June 2, 2021:
1. Pat Brahmer, Surface Emission Monitoring (SEM) Technician, Environmental Monitoring Technologies

Other Attendees on June 17, 2021:
1. Michael Melan, Environmental Manager, Waste Management
2. Steven Niehoff, Director of Air Programs, Waste Management

Contact Email Address: Mike Melan, Mmelan1@wm.com

Purpose of Inspection: Comparative surface emission monitoring (SEM) and Clean Air Act (CAA) inspection

Facility Type: Municipal Solid Waste Landfill

Regulations Central to Inspection: NSPS Subpart WWW; NESHAP Subpart AAAA

June 2, 2021:
Arrival Time: 10:05 A.M.
Departure Time: 3:48 P.M.

June 17, 2021:
Arrival Time: 1:00 P.M.
Departure Time: 3:45 P.M.

Inspection Type:
☐ Unannounced Inspection
☒ Announced Inspection

OPENING CONFERENCE

☒ Presented Credentials
☒ Stated authority and purpose of inspection
☐ Provided Small Business Resource Information Sheet
☒ Small Business Resource Information Sheet not provided. Reason: Not a small business.
☒ Provided CBI warning to facility

The following information was obtained verbally from Mr. Brahmer, Mr. Melan, and Mr. Niehoff unless otherwise noted.

Process Description and Staff Interview:
Prairie Hill Landfill (the Landfill or Facility) has been subject to the NSPS since 2006. Staff that work with the gas collection and control system (GCCS) includes 4 gas operators, an operations manager, and a well technician. There are no expansion plans at the time of the inspection. The accepted waste stream includes 60% municipal solid waste (MSW), 30 to 40% inerts and construction and demolition (C&D) waste. The Facility considers inerts and "nondegradable waste" to include contaminated soils, concrete, auto fluff, and simple organics like plastics. In 2020, the facility accepted 18 tons of C&D. The inerts are removed from the LandGEM calculations if scale house data is available. The inerts are intermingled with the MSW and the location is not documented, except for the locations of asbestos, which is separated and covered. The facility's internal definition of "special waste" includes C&D and wood chips.

No significant amount of leachate was recirculated since 2018-2019. The Facility recirculated 3,000 gallons of leachate in 2020 and none in 2021 thus far. The leachate is being hauled out now. 40,000 gallons of leachate per day is hauled off-site by tanker trucks, drawing directly from the riser or the 20,000-gallon underground tank. The Facility has trouble finding enough publicly owned treatment works (POTW) to accept leachate. The Facility is permitted in the past 6

months to install and operate a leachate evaporation unit, and started the construction process, which is projected to be done by mid-2022. 45,000 gallons of leachate per day will be processed once the unit is up and running. Heat from the landfill gas would be used to heat the evaporator. The Facility is working with Landfill Gas Specialties on considering factors such as the cost of hauling leachate (5 to10¢ per gallon) and other options.

There has not been any groundwater exceedances nor quarterly gas probes hits. The most recent well water level measurements were taken in May 2020 and September 2020, as part of the hazardous air pollutant (HAP) program. Generally, the Facility measures the water levels in wells every couple of years. Moving forward, the Facility will monitor two times per year so to have historical tracking data to see trends in the overall GCCS management. The well water pumps are checked when measuring gas well parameters.

The Facility has 1 blower and 1 flare, both of 4,000 cubic feet per minute (cfm) capacity. There is no back-up blower. The system vacuum is at 50% to 55% capacity. The Facility aims to maintain 30 inches of water column ("w.c.), even on the far side of the site. If there is a blockage, such as due to a sag in a pipe or a surge in the system, segments in the system are segregated. Differential pressure is monitored downstream to determine system pressure in a particular section of the GCCS and available vacuum. The Facility uses the KYGas calculator to determine friction loss.

The flare is non-assisted, monitored for gas flow rate and temperature, and has a system shutdown setpoint. The maximum heat input is 506 British thermal unit (BTU)/feet or 2 million BTU/min. Performance test conducted at the flare includes testing for velocity, BTU content, and visible emissions. The bag sample test at the utility flare is conducted annually and tests for methane, sulfur, and non-methane organic compounds (NMOC).

The current gas flow rate is 2,300 to 2,400 cfm. According to LandGEM, methane generation is about 1,150 cfm, which matches with the assumption that 50% of the current gas flow rate is methane. Actual methane generation may be lower than shown on LandGEM because a portion of the gas stream comprises of inerts. The gas consists of 35 to 60% methane. The k value used in LandGEM is 0.2 and is adjusted based on factors, such as whether leachate is recirculated or not.

Capping is anticipated to occur in the next 4 to 5 years as such, there will not be any areas at final grade soon. The last cell, Cell 6, was constructed 4 years ago. Well construction events occur annually and may last 3 to 6 months long. The most recent well installed was on the east side on the Landfill, west of the northeast corner of Cell 6. No new wells were drilled recently. Wells in the SEM areas by the flare are being raised.

There has not been any fires nor subsurface oxidation events since 2010 at the Prairie Hill Landfill site. There was a fire at the Whiteside Landfill, which is a closed landfill acquired by Prairie Hill Landfill which may have been due to a broken pipe or airline. The area surrounding around the fire continues to be monitored monthly.

The size of the active fill area is about 2 acres or less. The active area at the time of the on-site inspection on June 2, 2021 is at Phase 5, Cell 1 and 2. The Facility defines dangerous areas excluded from surface emission monitoring (SEM) to include 4:1 slopes if the weather does not permit, such as during rainfall. At the time of the inspection, there is no area greater than 4:1, except a few small areas in the active area with 3:1 slope. Currently, the external slopes are at grade. The internal slopes are still operational and part of the working face. 25% of the exterior slopes are at 4:1 now. After the Landfill reaches grade and is capped, 70 to 80% of the Landfill will be 4:1 slopes.

The well technician has conducted SEM for the past 5 years. The well technician present during the inspection relayed that the Facility's quarterly SEM has found few to no exceedances. The SEM path traversed includes only the portions of the Landfill that are in an "L" shape by the flare and the closed "football-field" shaped area of the Landfill. The SEM procedure includes monitoring at only specific points along the SEM path, as instructed and documented in a pre-drawn map provided to the well technician and does not consist of off-path monitoring nor penetration monitoring. The well technician monitors leachate in leachate points in the closed areas. Leachate protrusions are at the base of the Landfill, in the closed area, and include L308 and L309 on the north side of the Landfill.

Horizontal collectors are installed throughout the Landfill. Only Phase 6 East does not have horizontal collectors because the waste is under 5 years old. Some of the early collection wells in areas of waste that is less than 5 years old are not up to standards because of the shallow depth of the waste. Horizontal collectors are installed on an as-needed basis, such as to control odors or to replace decommissioned wells. Wells are installed depending on filling sequence so that dozers or trucks do not run into the wells.

The Facility does not conduct radius of influence (ROI) calculations beyond the final design of the GCCS. The effectiveness of the wells is compared to LandGEM calculations, SEM hits, and whether vacuum from neighboring wells are affecting nearby wells. The industry standard for ROI is 1 well/acre, although usually more wells are installed.

As of the date of the inspection, the most recent permit is from 2019, and the most recent GCCS design plan and LandGEM calculations are dated 2014. The Facility does not have documentation on the cover integrity standard operating procedure.

TOUR INFORMATION

EPA Tour of the Facility: Yes

Data Collected and Observations:
During Comparative SEM conducted by EPA, 51 SEM exceedances above 500 ppm were found. All of the hits, minus one, were confirmed by the Facility's well technician. Large areas of concern and with exceedances include the whole toe of the Landfill by GW-23. The entire side of the slope south of the active area by GW-406 had elevated SEM measurements, exceedance hits, leachate seeps, and exposed waste. The area within a 40 feet radius around GW-33 was elevated. Exposed waste was seen throughout the Landfill in areas that have not been filled for

an extended period of time. Healthy vegetation was minimal throughout the Landfill. Areas with vegetation have not been mowed. Audible bubbling liquid was heard and seen in liquid-filled holes. Strong gas odors were detected in areas with SEM exceedances, especially in areas where excessively high levels of methane were detected. A pool of liquid was on the top of the Landfill with exposed waste at EPA GPS Waypoint #134 (See Appendix B, Table 4).

Photos and/or Videos: were taken during the inspection.

Field Measurements: were taken during this inspection.

- Field measurements include monitoring methane levels at the surface of the Landfill. See Appendix B for exceedances found.

RECORDS REVIEW

1. EMT SEM technician's SEM path map

CLOSING CONFERENCE

☒ Provided U.S. EPA point of contact to the facility

Requested documents:

- SEM path map and confirmation of the most recent version of the permit.
- SEM path map taken for the past 5 years (Q2-2016 to Q1-2021).
- Results of both the 10-day rescans and the 30-day re-scans of the SEM hit locations found during EPA's inspection.
- Latest LandGEM model calculations with supporting back-up information used to determine L_o and k values.
- Drawing showing final, intermediate, and daily cover acres.
- Provide the number of acres under each type of cover and the size of the current fill area.
- Provide goals for vacuum across the site.
- Provide explanation for collectors not found by EPA during inspection – GW-405, GW-403, HC-19 and GW-14.
- Verify if GW-48 was labeled at the time of EPA's SEM inspection.
- GPS coordinates of all the wells.
- 5 years of monthly cover integrity reports from 6/2016 to 5/2021.
- Gas probe readings from 5/2019 to Q1-2021.
- Construction permit submittal for the 4000-cfm flare.
- Device specifications for the existing 4000-scfm candlestick flare.
- 5 years of leachate extraction history (6/2016 to 5/2021).
- Provide waste stream acceptance by category from 6/2019 to 5/2021.
- Liquid levels obtained in wells from 5/2016 to date. Please make sure the documents have dates clearly written on them. Please include available perforation.
- SEM history from Q3-2019 to Q1-2021.
- Wellhead reads from 6/2019 to 5/2021, as well as the summary of wells that deviated from one of the monitored parameters.

- History of HOV's submitted if any.
- Semi-annual compliance reports submitted to IEPA from 12/2019 to 12/2020.
- Flare start-up, shutdown, and malfunction (SSM) records and flow tracking from 2/2019 to 5/2021, including flare maintenance logs and monitored parameters.
- Results of annual landfill gas (LFG) sulfur tests performed in 2020 and 2021.
- "Annual open flare gas sampling" from 2020 and 2021.
- Current GCCS drawing.
- Running total reduced sulfur (TRS) emission data and accompanying calculations (hourly, monthly, annually) (6/2016-5/2021).
- Updated list of currently active wells and decommissioned wells since the information response submitted to EPA's June 24, 2019 114 information request.
- Quarter groundwater test reports, from Q2/2016-Q1/2021.

Concerns: The SEM path that the EMT SEM technician traverses only covers the closed areas of the Landfill and at specific points in those areas. The technician relayed to EPA that this path and the points monitored are under the instruction of the previous Environmental Manager. The 51 exceedances that EPA detected and the observations listed in the above section, "Data Collected and Observations", are concerns.

DIGITAL SIGNATURES

Report Author: Mei, Vicky Digitally signed by Mei, Vicky Date: 2021.08.16 10:27:34 -05'00'

Acting Section Chief: ETHAN CHATFIELD Digitally signed by ETHAN CHATFIELD Date: 2021.08.16 10:48:52 -05'00'

APPENDICES AND ATTACHMENTS

1. Appendix A: Digital Image Log
2. Appendix B: Field Measurement Data

Facility Name: Prairie Hill Landfill
Facility Location: 18762 Lincoln Road, Morrison, IL 61270
Date of Inspection: June 2, 2021

APPENDIX A: DIGITAL IMAGE LOG

1. Inspector Name: Vicky Mei and Daniel Heins	**2. Archival Record Location:** Electronic Record System

Image Number	File Name	Date and Time (incl. Time zone and DST)	Description of Image
1	20210602_130826.jpg	August 2, 2021, 4:20 PM CST	Photo of an SEM exceedance location above a hole with audible bubbling liquid
2	20210602_130938.mp4	August 2, 2021, 4:20 PM CST	Video of audible bubbling liquid in a hole with methane measurements over 2%.

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APPENDIX B: FIELD MEASUREMENT DATA

Calibration at 9:25 AM

Table 1: Calibration Precision and Response Time

TVA #1: A56575	
Meter Readings of 500 ppm Calibration Gas	Response Time
492	3.75
499	5.98
499	4.38
Average: 497	Average: 4.70
TVA #2: SL1555	
Meter Readings of 500 ppm Calibration Gas	Response Time
496	4.43
496	3.97
495	4.00
Average: 496	Average: 4.13

Upwind: -1.4 ppm at -89.879, 41.8044 (GPS Waypoint #116)
Downwind: -0.8 ppm

Table 2: Exceedance Values

Exceedance Values						
Exceedance #	EPA GPS Waypoint #	Latitude	Longitude	EMT GPS Waypoint #	EPA Exceedance Reading (ppm)	EMT Exceedance Reading (ppm)
1	114 (TVA #1)	-89.8818	41.80189	436	1800	700
2	115	-89.8817	41.801918	437	8500	4370
3	87	41.8042	-89.880774	443	670	7187
4	89	41.80506	-89.879958	445	1300 (and 1300 with EPA TVA #2)	763
5	117 (TVA #1)	-89.8796	41.805322	448	2100 (and 2500 with EPA TVA #2)	1106
6	90	41.80514	-89.880042	446	1700	919
7	105	41.80457	-89.880707	444	1600 (and 1000 with EPA TVA #2)	1431
8	Location of GW-408.			441	3300	983

9	118 (TVA #1)	-89.881	41.803023	440	1000 (and 2000 with EPA TVA #2)	1150
10	119 (TVA #1)	-89.8811	41.802821	439	1000	1.24%
11	106	41.80271	-89.88106	438	6000	5092
12	120 (TVA #1)	-89.8809	41.803394	442	600	1312
13	108	41.80541	-89.880171	447	540	771
14	121 (TVA #1)	-89.8817	41.804404	449	700	1047
15	122 (TVA #1)	-89.8818	41.804242	451	5%	9.99% (flamed out)
16	123 (TVA #1)	-89.8818	41.804251	450	2800	2.84%
17	124	-89.8818	41.804239	452	1%	2.57%
18		41.80392	89.88187	453	3600	1.94%
19	125	-89.8824	41.804111	454	1300	1451
20	126	-89.8825	41.804091	455	644	722
21	109	41.80391	-89.882799	457	1.30%	8.74%
22	127 (TVA #1)	-89.8827	41.804084	456	9800	0.83%
23	128 (TVA #1)	-89.8828	41.804066	458	1400	2250.00%
24	129 (TVA #1)	-89.8835	41.804156	459	1200	1.13%
25	110	41.80395	-89.883529	460	3000	5430
26	111	41.80395	-89.883531	461	1300	674
27	130	-89.8841	41.804165		790	Not confirmed.
28	131	-89.8843	41.803953	462	1200	1389
29	112	41.80359	-89.883941	463	1400	1026

30	113	41.80376	-89.884457	464	2000	4139
31	132	-89.8832	41.806275	465	670	812
32	133	-89.8832	41.80629	466	1500	2537
33		41.8068	89.88263	467	2300	1704
34	114 (TVA #2)	41.80716	-89.882106	468	1400	1486
35	117 (TVA #2)	41.80645	-89.880056	469	1054	1798
36	118 (TVA #2)	41.80747	-89.880212	470	5%	9.90%
37	135	-89.8809	41.80772	471	5000	3441
38	119 (TVA #2)	41.8074	-89.881703	473	1600	992
39	137	-89.8814	41.807771	472	2400	2276
40	138	-89.8814	41.807774	475	1500	3781
41	120 (TVA #2)	41.80744	-89.882205	476	3200	2931
42	121 (TVA #2)	41.80737	-89.881933	474	2000	1870
43	139	-89.8817	41.807776	477	513	894
44	122 (TVA #2)	41.8074	-89.88254	478	820	1112
45	Location of GW-53.			479	1900	3938
46	123 (TVA #2)	41.80617	-89.885306	480	2%	1.26%
47	127 (TVA #2)	41.8059	-89.885236	481	1501	1543
48	140	-89.8854	41.805614	482	700	721
49	141	-89.8854	41.80515	484	2200	9.99% (flamed out)
50	128 (TVA #2)	41.80539	-89.885302	483	2.50%	3.75%
51	129 (TVA #2)	41.80465	-89.885557	485	2.20%	1.43%

Table 3: Exceedance Descriptions

Exceedance Descriptions		
Exceedance #	Location Description	Observations
1	75 ft West of flare; 50 ft North from road; 90 ft downslope South of GW-23.	Dead vegetation at toe of landfill.
2	20 ft East of Waypoint #114.	Elevated measurements and exceedances found within 20 ft radius.
3		Dead vegetation.
4	50 ft downslope Southeast of GW-70.	Erosion.
5	30 ft North of BC5.	Dead vegetation.
6	GW-70.	Erosion.
7	85 ft North of GW-22R.	Erosion.
8	GW-408.	
9	30 ft West of GW-408.	
10	40 ft upslope of GW-407.	No vegetation.
11	GW-407.	
12	Between GW-407 and GW-406.	
13	110 ft North of GW-70; 100 ft upslope of BC5; in between GW-70 and GW-69.	Erosion trench.
14	GW-406.	
15	50 ft South of GW-406; South of fill area.	Bubbling leachate with audible gas escaping from huge hole. Huge area of side slope with exposed waste and leachate seeps.
16	50' S. of GW-406; South of fill area.	Leachate seep with audible bubbling in another huge hole.
17	50' S. of GW-406; South of fill area.	Audible bubbling in another nearby hole. Whole side of slope with leachate filled holes and elevated methane readings and exceedances within 20 ft radius.
18	Distressed veg + leachate stain/washout	
19	Between GW-406 and GW-33.	
20	10' from EPA Waypoint #125.	
21		Leachate and distressed vegetation.
22	GW-33.	

23	20' W. of GW-33.	Many exceedances detected within 40 ft radius of GW-33.
24	Between GW-33 and GW-41.	Exceedance in hole.
25	20' W. of GW-34.	Cracks in washout.
26	40' uphill of GW-40.	Erosion.
27	GW-41.	
28	100' W. of GW-41.	Erosion trench.
29	GW-39.	
30	By the road.	Inactive area with uncovered waste.
31		
32		
33	In what appeared to be auto fluff (central area of top)	
34	HC19.	
35	East slope; 60' W. of GW-68.	Erosion.
36	100' uphill of Southeast Leachate Riser, hole in rivulet	
37		Erosion; elevated measurements within 10 ft radius.
38	30' E of W59 / north slope rivulet	
39	50' S. of road; 100' W. of Leachate-308.	
40	150 ft West of Leachate-308; 50 ft upslope from road on North slope.	
41	Rivulet 40' W of W59	
42	Well 59 (in rivulet)	
43	30' upslope from road and GV-17.	Dried discolored leachate seep.
44	By the exposed mattress immediately beside W58	
45	GW-53.	Strong gas odor.
46	Well 49	
47	Well 52	
48	Unmarked gas well; 100 ft South of GW-52 on West slope.	
49	GW-47.	
50	Well 51	
51	Well 50	

Table 4: Observations

EPA Waypoint #	Latitude	Longitude	Description
134	-89.881	41.8061	Pooling at top of Landfill with exposed waste
136	-89.881	41.8077	Leachate seep

Bump Check with 500 ppm Calibration Gas at 3:35 PM
TVA #1: 460 ppm
TVA #2: 459 ppm

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TVA #1 Comparative SEM Path Taken:
(Map data from Google Maps 2021)

Facility Name: Prairie Hill Landfill
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TVA #2 Comparative SEM Path Taken:
(Map data from Google Maps 2021)

Facility Name: Prairie Hill Landfill
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TVA #1 Exceedances Found:
(Map data from Google Maps 2021)

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TVA #2 Exceedances Found:
(Map data from Google Maps 2021)